CAREX EXILIS DEWEY (CYPERACEAE) IN MISSISSIPPI BOGS

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ABSTRACT

Mississippi was surveyed for the presence of *Carex exilis*. The species was detected in the six southernmost counties. The floristic associates, habitat characteristics, and distribution are provided for *C. exilis* in Mississippi.

INTRODUCTION

As a member of *Carex* section *Stellulatae, C. exilis* Dewey is distinctively isolated from other sectional taxa which lack solitary spikes, involute leaves and large anthers (Reznicek and Ball 1980). The primary north temperate-boreal range includes fens and bogs from Delaware and Maryland north along the coast to Newfoundland, and inland from New York to Minnesota and northwestern Ontario. Phytogeographically, Reznicek and Ball (1980) have also noted the remarkable occurrence of two southern disjunct populations. In the south, they interpreted the two isolated stations in the coastal plain at Moore County, North Carolina and George County, Mississippi as relic populations from a former wider distribution during glacial maxima. In this study, we evaluated the distribution and general ecology of *Carex exilis* from the southernmost disjunct area in Mississippi.

MATERIALS AND METHODS

We examined a variety of known bogs with ecologically similar and dissimilar profiles in comparison to the locality where Ken Rogers first collected *Carex exilis* (*Rogers 2919*, 12 April 1970, MISS, NCU, VDB) in George County, Mississippi. These other sites were identified from high

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altitude infrared photography. At each site we recorded population size, habitat type, and associated species. Specimens of *C. exilis* were deposited in the following herbaria: ctb (personal herbarium of Charles T. Bryson), IBE, MICH, MISS, MMNS (Mississippi Museum of Natural Science), NLU, TENN, UARK, VDB and WARM. Additional duplicates will be distributed later.

RESULTS AND DISCUSSION

Our field survey has identified *Carex exilis* from a total of 16 populations in six Mississippi counties (Fig. 1). Compositional variation within and among these bog communities is often quite variable depending upon the interaction between fire history and soil hydroperiod. Nevertheless, *C. exilis* consistently occupies a distinctive niche situated at the extreme ends of an ecological gradient across fire frequency, soil moisture, and organic matter.

Without exception, populations are restricted to strongly acid, permanently saturated, deep organic muck (quaking bogs). Although soil surveys are not available for all sites, the typical soil appears to be the Dorovan Series; a dysic, thermic, Typic Medisaprist (e.g. Nichols et al. 1983). The organic muck horizon may range from one to three meters in depth, and the entire pedon at one site has been reported to exceed six meters. Populations are further confined within these bogs to sites where the frequency of fire, in combination with the extreme edaphic parameters, prohibits woody plant succession. Populations are usually centered on the deepest muck located near small intermittent or perennial surface drainageways of open bogs. With few exceptions, *C. exilis* appears to dominate the microhabitat in terms of individual number as well as above and below ground biomass. Populations range in size from several hundred to several thousand plants, but several sites are characterized by low population vigor which is variably due to infrequent fire, successional encroachment of a woody plant community, and the scarcity of adequate microhabitat.

In a strict sense, only two species are consistently associated with *Carex exilis* or its microhabitat. By this definition of association, we recognize the compositional heterogeneity among and within bog communities and emphasize the relative homogeneity of the *C. exilis* microhabitat. The first associate, *Lindera subcoriacea* Wofford (bog spice bush, Lauraceae), is a woody component of the open, highly organic, and predominantly herbaceous bog community as well as the early seral evergreen shrub phase. Of 17 populations of *L. subcoriacea* in Mississippi (Gordon et al. 1986), *C.*

FIG. 1. Distribution of *Carex exilis* Dewey in Mississippi.

exilis is an associate at 14 sites. Although both taxa may coexist in the open bog, *C. exilis* is absent where bog spice bush occurs within or along the border of a shrubby complex which includes *Cliftonia monophylla* (Lam.) Britton ex Sarg., *Cyrilla racemiflora* L., *Ilex coriacea* (Pursh) Chapman, *Persea palustris* (Raf.) Sarg., *Magnolia virginiana* L., *Smilax laurifolia* L., and *Hypericum brachyphyllum* (Spach) Steudel. Despite the relative tolerance of *L. subcoricea* to a partial overstory, fire is critically required for viable populations of both associates.

The second associate, *Carex turgescens* Torr., does not exhibit the habitat fidelity of *L. subcoriacea*. *Carex turgescens* is known from wet depressions in other communities of the lower coastal plain such as pine flatwoods,

savanna, and cypress-tupelo gum margins. *Carex turgescens* may also occur without *C. exilis* along narrow bog drainages of siliceous and low organic soils. However, the within bog distribution pattern of *C. turgescens* is highly correlated with *C. exilis*. The preference of *C. turgescens* for hydric soils corresponds to the conditions present in the deep organic muck where *C. exilis* occurs. *Carex turgescens* is an associate in all 16 populations of *C. exilis*.

Other taxa which may occur among populations of *C. exilis* also occupy a variety of other edaphic and fire regimes. These species include *Sarracenia alata* (Wood) Wood, *S. psittacina* Michx., *Oxypolis filiformis* (Walt.) Britt., *Lophiola americana* (Pursh) Wood, *Zigadenus densus* (Desr.) Fern., *Rhexia alifanus* Walt., *Panicum spretum* Schult., *Rhynchospora rariflora* (Michx.) Ell., *R. chapmanii* M. A. Curtis, and *Scleria baldwinii* (Torr.) Steud. Rare species (Ms. Natural Heritage Program 1987) which have been found with *C. exilis* are *Panicum nudicaule* Vasey, *Rhynchospora macra* (C. B. Clarke) Small, *Xyris scabrifolia* Harper, *X. drummondii* Malme., *Lachnocaulon digynum* Korn., *Pinguicula primuliflora* Wood and Godfrey, and *Calopogon barbatus* (Walt.) Ames.

In the short time since Wofford (1983) described *Lindera subcoriacea* as a new taxon from Mississippi and Louisiana, botanists in other southeastern states have discovered additional isolated populations of this rare shrub (Cary Norquist, Botanist, U.S. Fish and Wildlife Service, Jackson Field Office, Jackson, MS, pers. comm.) To the extent that *L. subcoricea* and *Carex exilis* are ecologically associated in Mississippi, we predict that additional southeastern records for this sedge will likely be made in other permanently saturated, highly organic, and fire dependent bogs occupied by *L. subcoriacea*.

For reasons somewhat similar to *Lindera subcoriacea, Carex exilis* may have been overlooked because of its early spring phenology; peak flower and achene production ranges from early March to late April. However, *C. exilis* is unquestionably rare by virtue of its habitat. These deep peat bogs comprise an extremely small portion of the "pitcher plant" communities in Mississippi which are universally threatened by drainage, fire exclusion, silvicultural practices, and urbanization.

Specimens examined and collected by county are as follows: MISSISSIPPI. **George Co.**: 12 Apr 1970, *Rogers 2919* (MISS, NCU, VDB); 5 Apr 1972, *Rogers 7935* (VDB); 5 Apr 1972, *Rogers 7937* (NCU, TENN); 16 Apr 1983, *Wofford & Murrell 83-1* (VDB); 27 Mar 1986, *Gordon, Jones & Wiseman 3146 & 3147* (ctb, MMNS); 15 Apr 1986, *Bryson & McDearman 4165* (ctb, MMNS); 15 Apr 1986, *Bryson & McDearman 4162* (ctb, IBE, MICH, MINN, MMNS, NLU, TENN, UARK, VDB, WARM). **Greene Co.**: 11 Apr 1979, *Gordon 1006* (MMNS); 19 Mar 1982, *Gordon & Burris 2758* (ctb, MMNS). **Harrison Co.**: 16 Apr 1986, *Bryson & McDearman 4177* (ctb, MMNS), *Bryson & McDearman 4180* (ctb, MMNS); 22 Apr 1986, *McDearman 4001* (MMNS); 22 Apr 1986, *McDearman 4003*;

22 April 1986, *McDearman 4003* (MMNS); 24 Apr 1986, *Gordon, Jones & Wiseman 3162* (ctb, MMNS), 2 May 1986, *McDearman 4009* (MMNS). **Jackson Co.**: 12 Mar 1985, *Gordon, Jones & Wiseman 3090 & 3091* (ctb, MMNS); 10 Apr 1986, *Gordon, Jones & Wiseman 3157* (ctb, MMNS); 16 Apr 1986, *Bryson & McDearman 4175* (ctb, MMNS). **Pearl River Co.**: 22 Apr 1986, *McDearman 4007* (MMNS); 24 Apr 1986, *Gordon 3167A* (ctb, MMNS). **Stone Co.**: 8 Apr 1986, *Gordon & Jones 3152 & 3153* (ctb, MMNS).

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